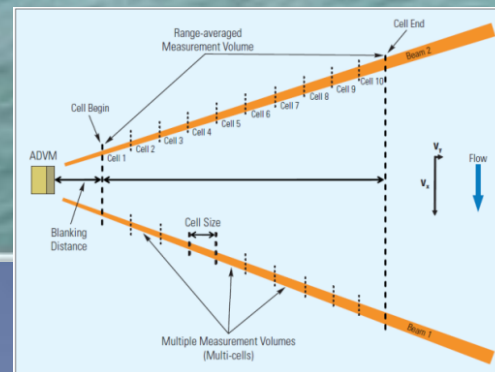
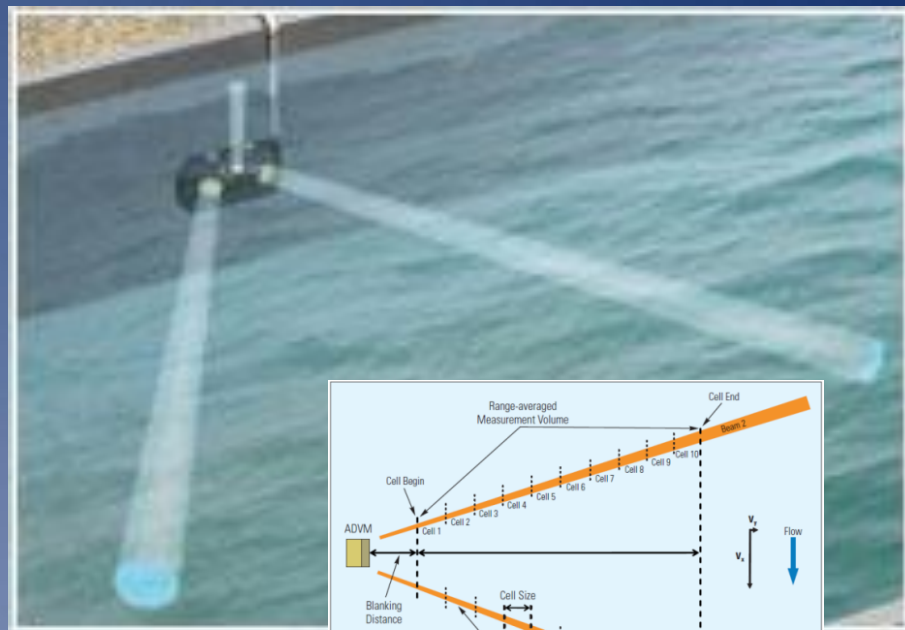


Computing Discharge Using the Index Velocity Method

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August 22, 2013

U.S. Department of the Interior
U.S. Geological Survey



Agenda

- Introduction – the index-velocity method
- The gage at SH 35 and a look at the data
- Standard ratings vs. index-velocity ratings
- Rating development at SH 35

Index-Velocity Method

The index velocity method is used to compute discharge based on stream velocity and cross sectional area

The index velocity method may be used to determine discharge for streams with:

- Variable backwater
- Tidal influence
- Seasonal variation in vegetation or algae

08188810 Guadalupe River at SH 35 near Tivoli, TX

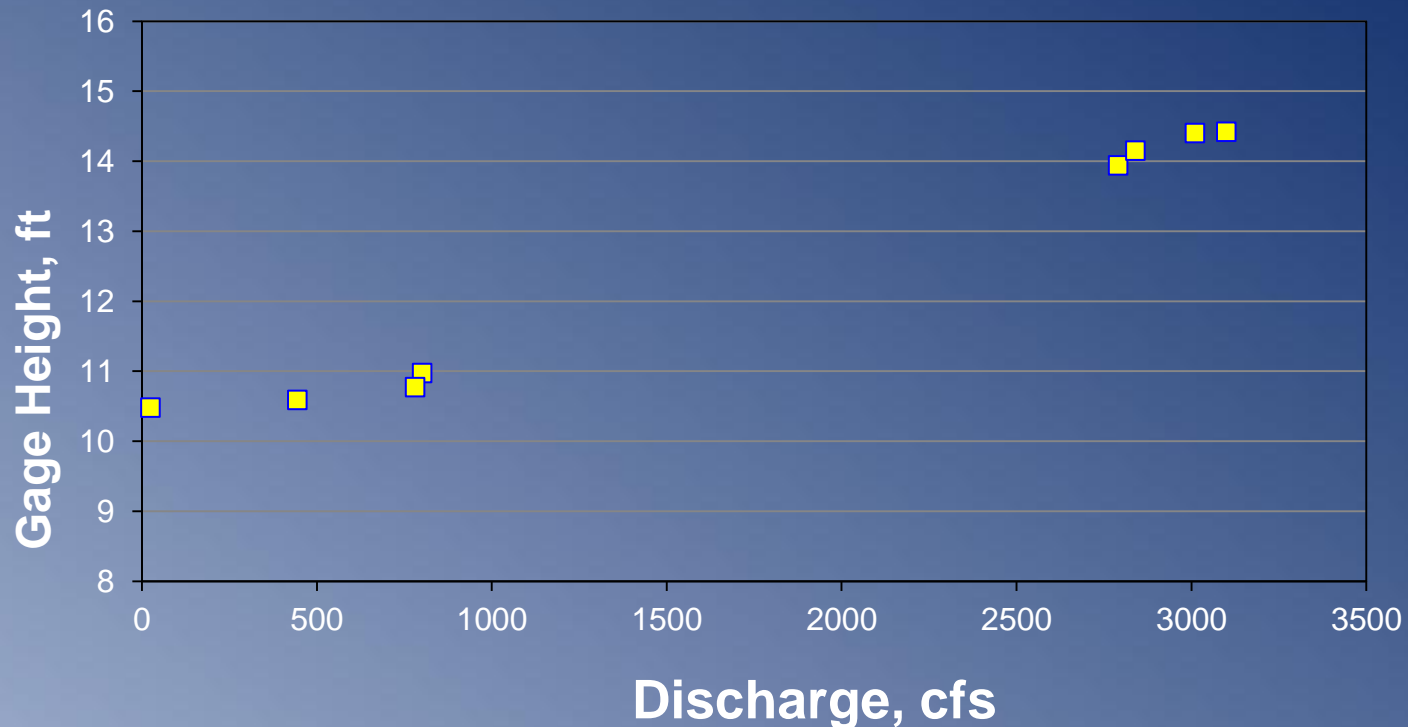


08188810 Guadalupe River at SH 35 near Tivoli, TX

- Acoustic velocimeter (AVM) installed April 2013
- 8 streamflow measurements made, 24.6 – 3,100 cfs



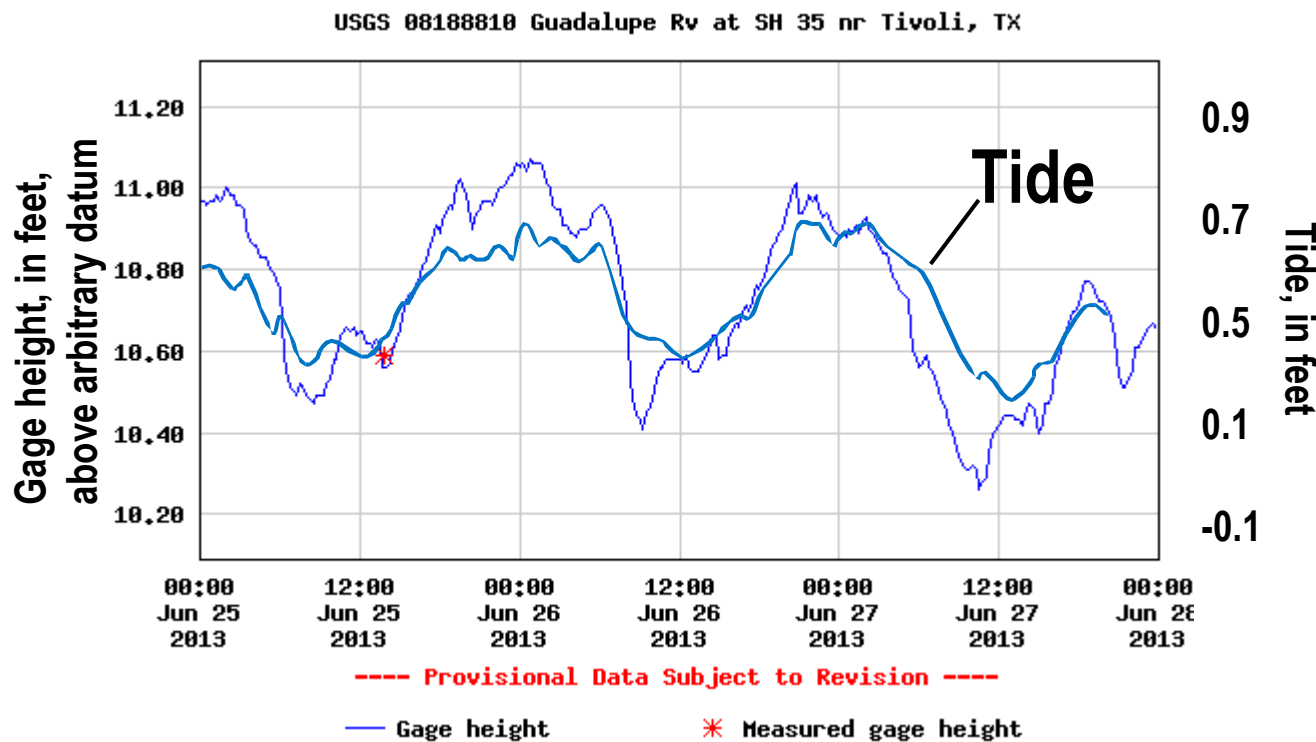
Streamflow measurements made at Guadalupe River at SH 35 near Tivoli, TX



Streamflows are affected by regulation and diversion... ... and tides

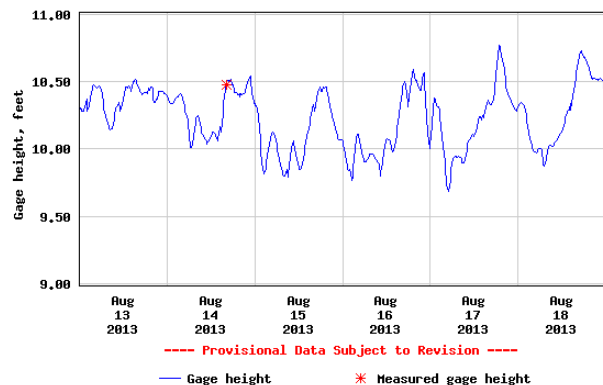
08188800

Regulation and diversion 2.7 miles upstream

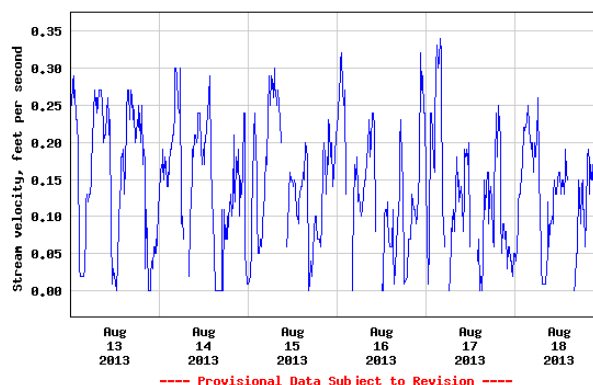


Stream stage and velocity data for Guadalupe River at SH 35 near Tivoli, TX

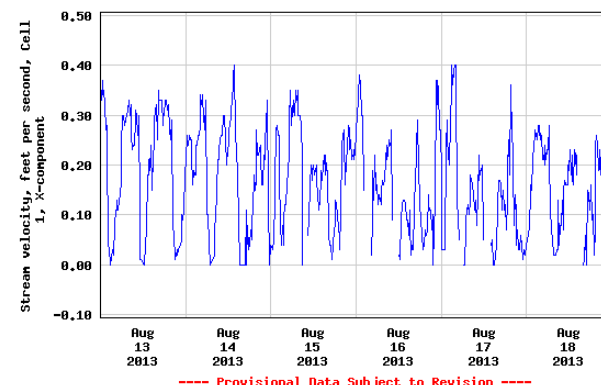
USGS 08188810 Guadalupe Rv at SH 35 nr Tivoli, TX



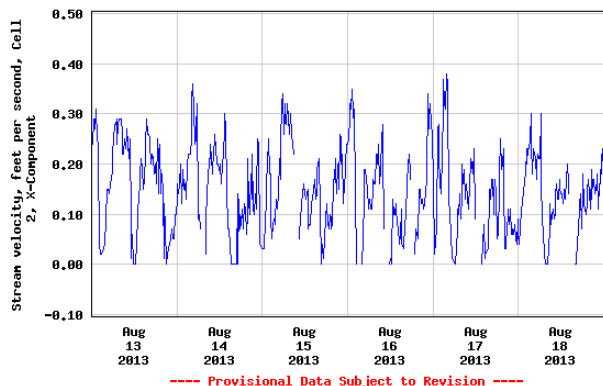
USGS 08188810 Guadalupe Rv at SH 35 nr Tivoli, TX



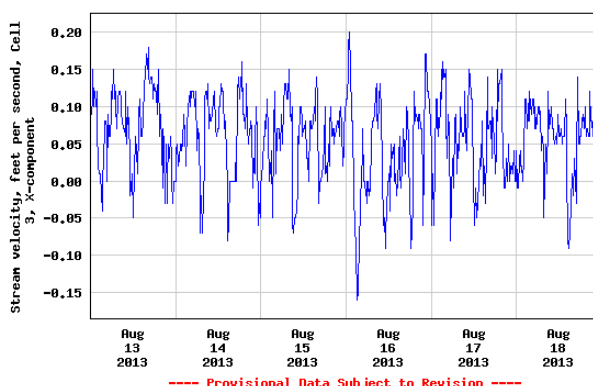
USGS 08188810 Guadalupe Rv at SH 35 nr Tivoli, TX



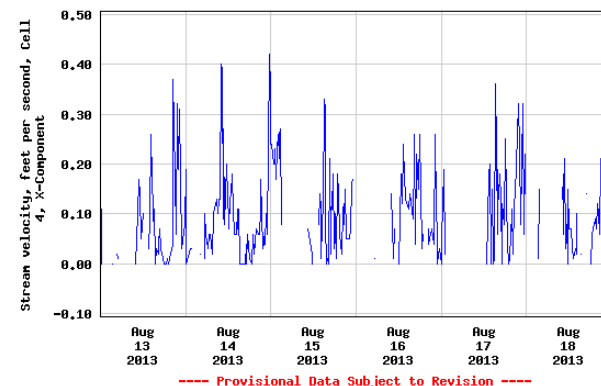
USGS 08188810 Guadalupe Rv at SH 35 nr Tivoli, TX



USGS 08188810 Guadalupe Rv at SH 35 nr Tivoli, TX

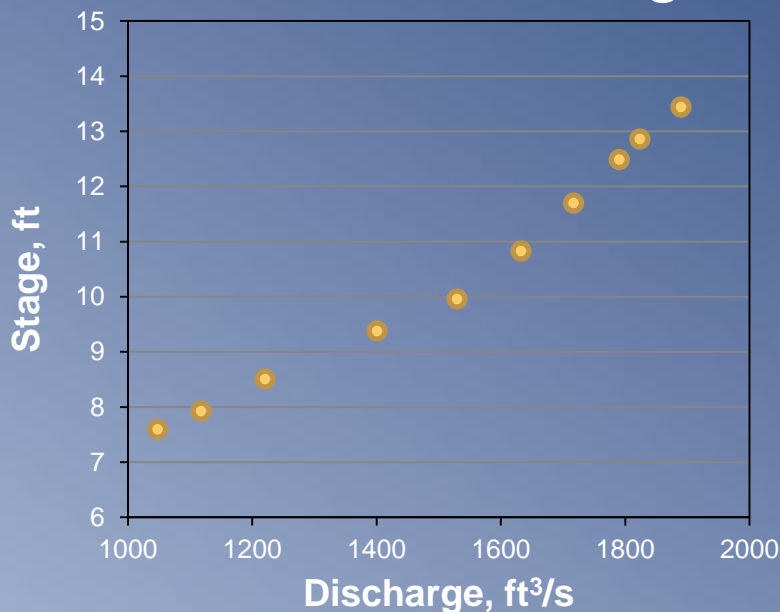


USGS 08188810 Guadalupe Rv at SH 35 nr Tivoli, TX

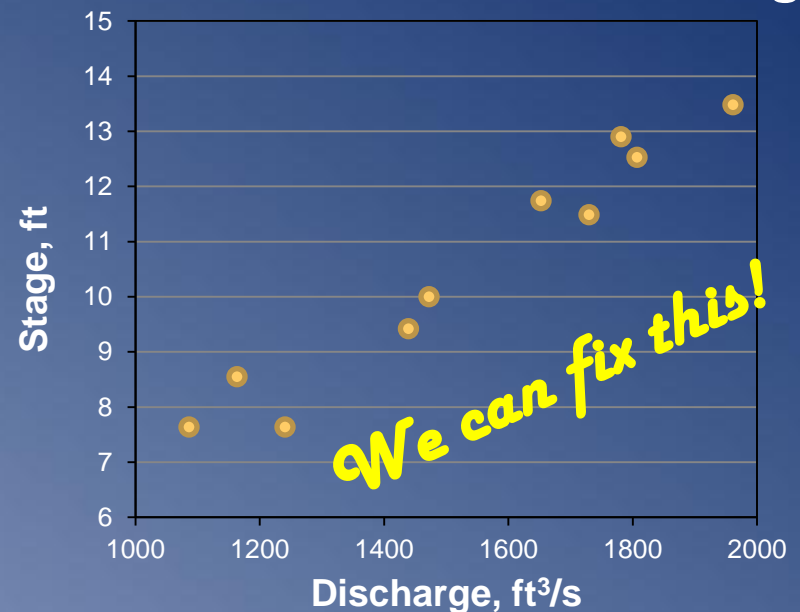


The index velocity method is especially appropriate when more than one discharge can be measured for a given stage.

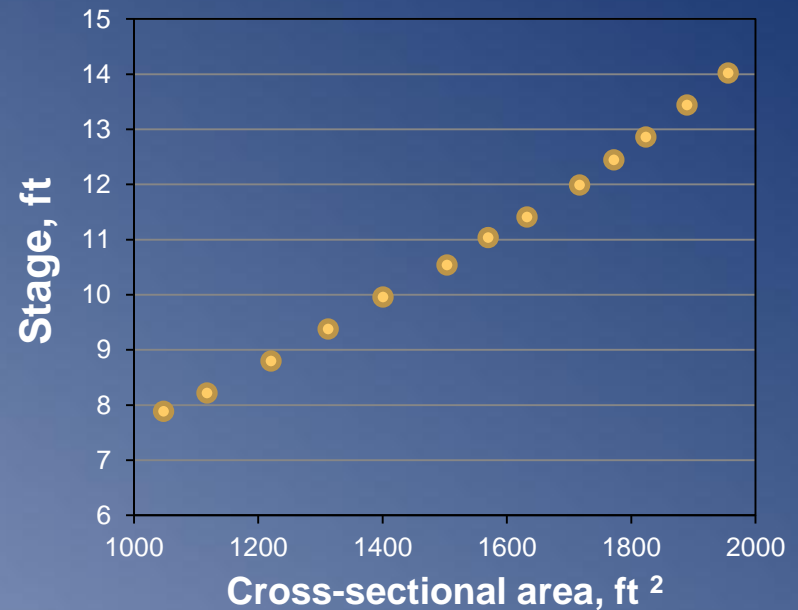
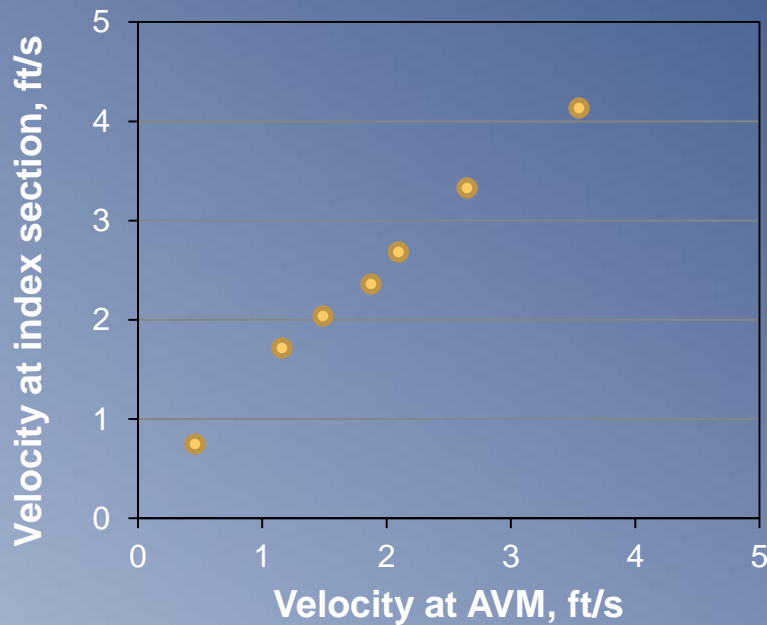
Standard Rating



“Not-so-Standard” Rating



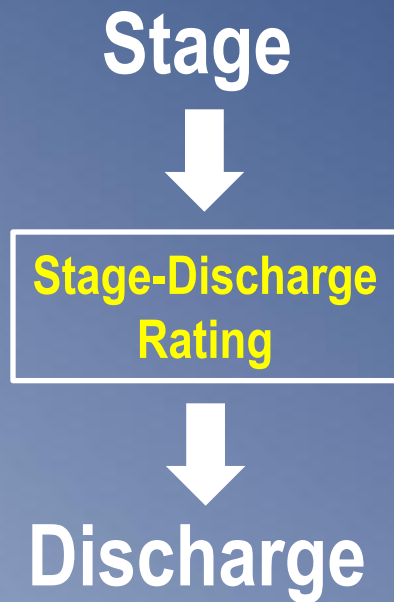
Computing discharge using the index velocity method differs from the traditional stage-discharge method by separating velocity and area into two ratings—the index velocity rating and the stage-area rating.



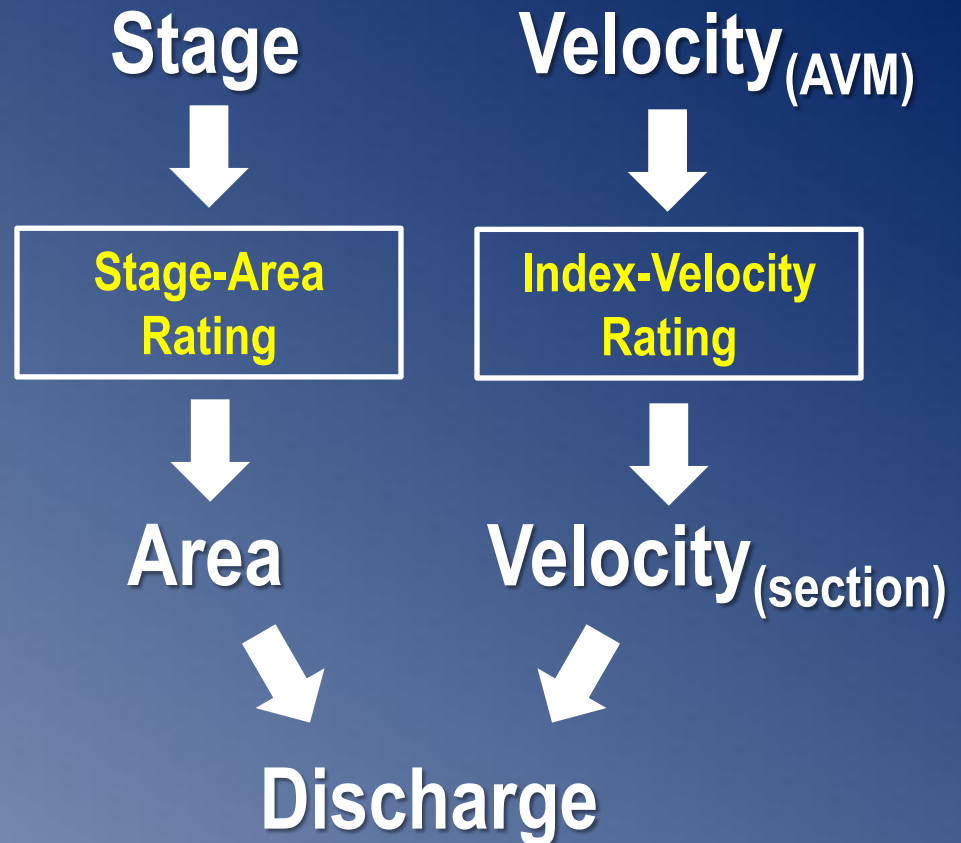
The outputs from each of these ratings, mean channel velocity (V) and cross-sectional area (A), are then multiplied together to compute discharge.

$$Q = V \times A$$

Stage-Discharge Method

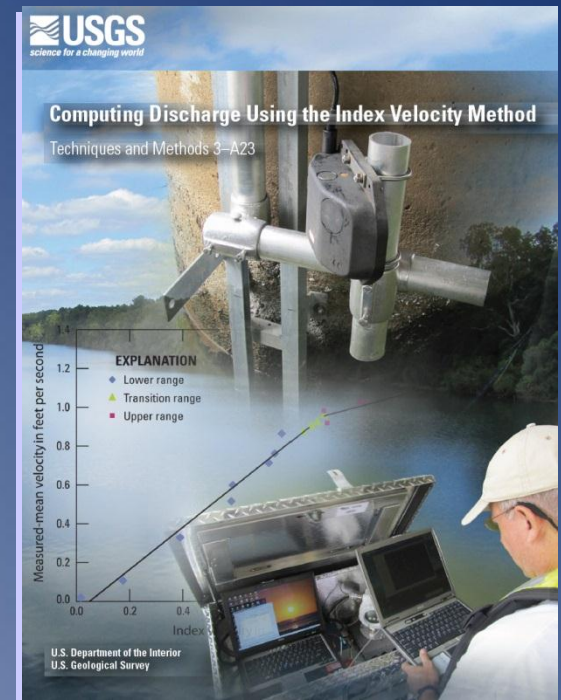


Index Velocity Method

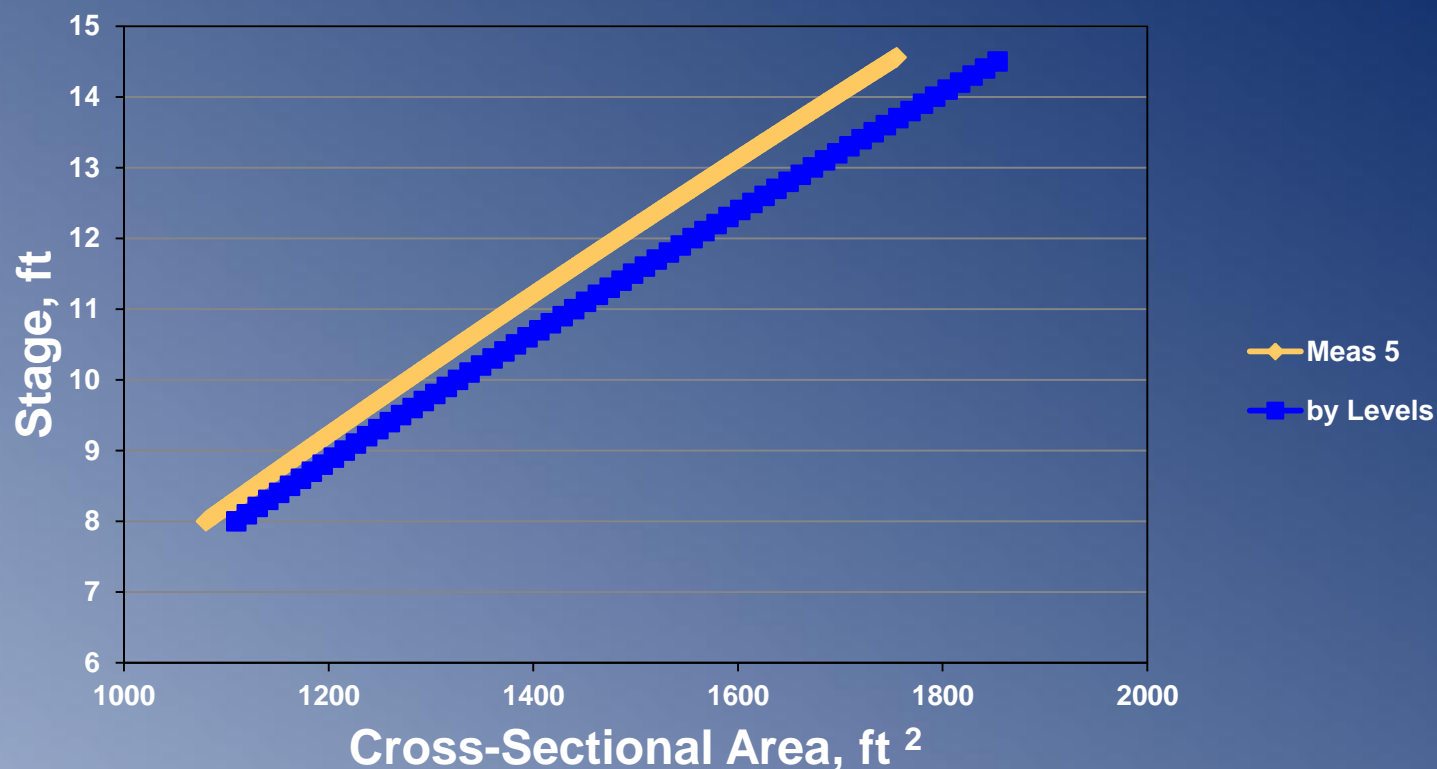


Standards and guidance

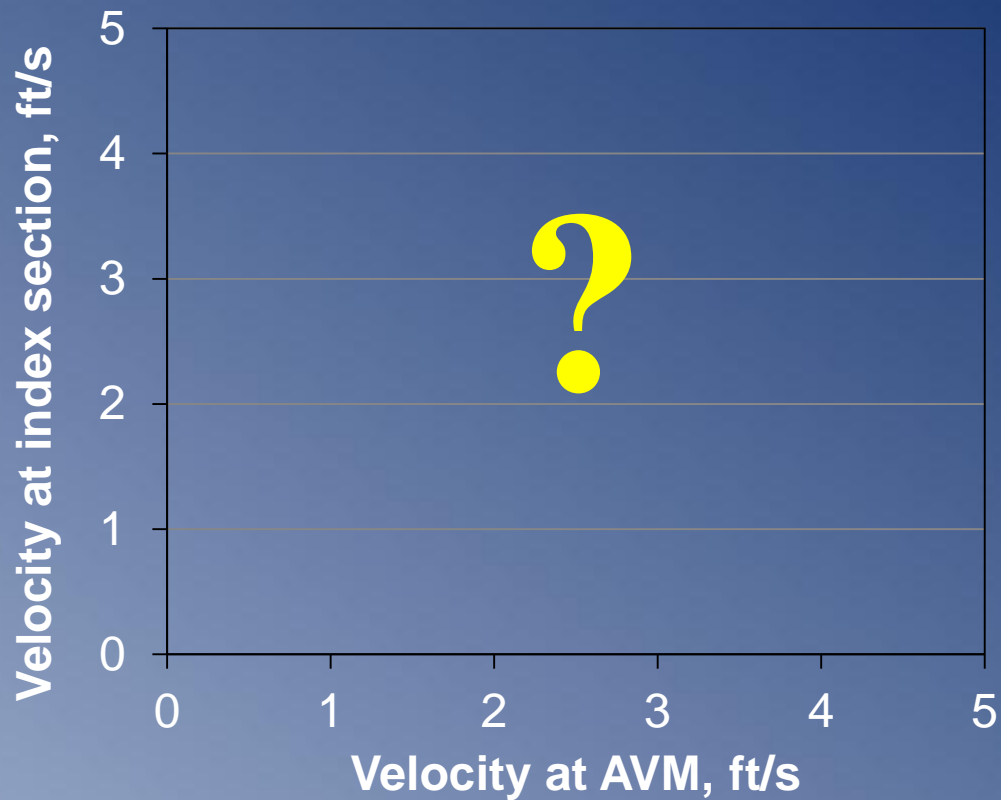
Computing Discharge Using the Index Velocity Method, Techniques and Methods 3–A23



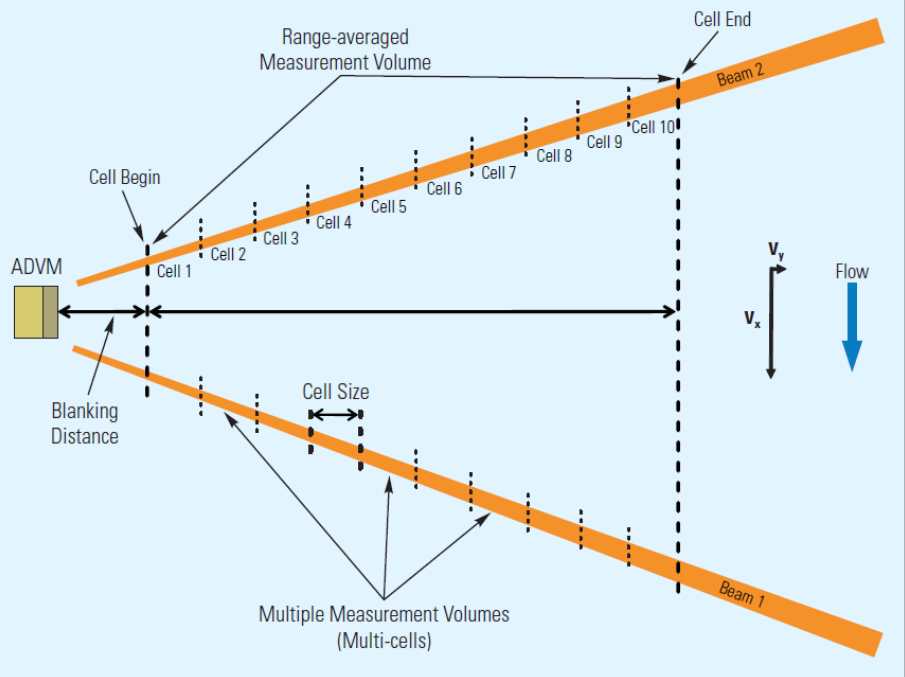
Stage-area ratings, 10 and 35 ft upstream from SH 35



Index-Velocity Relation at SH 35



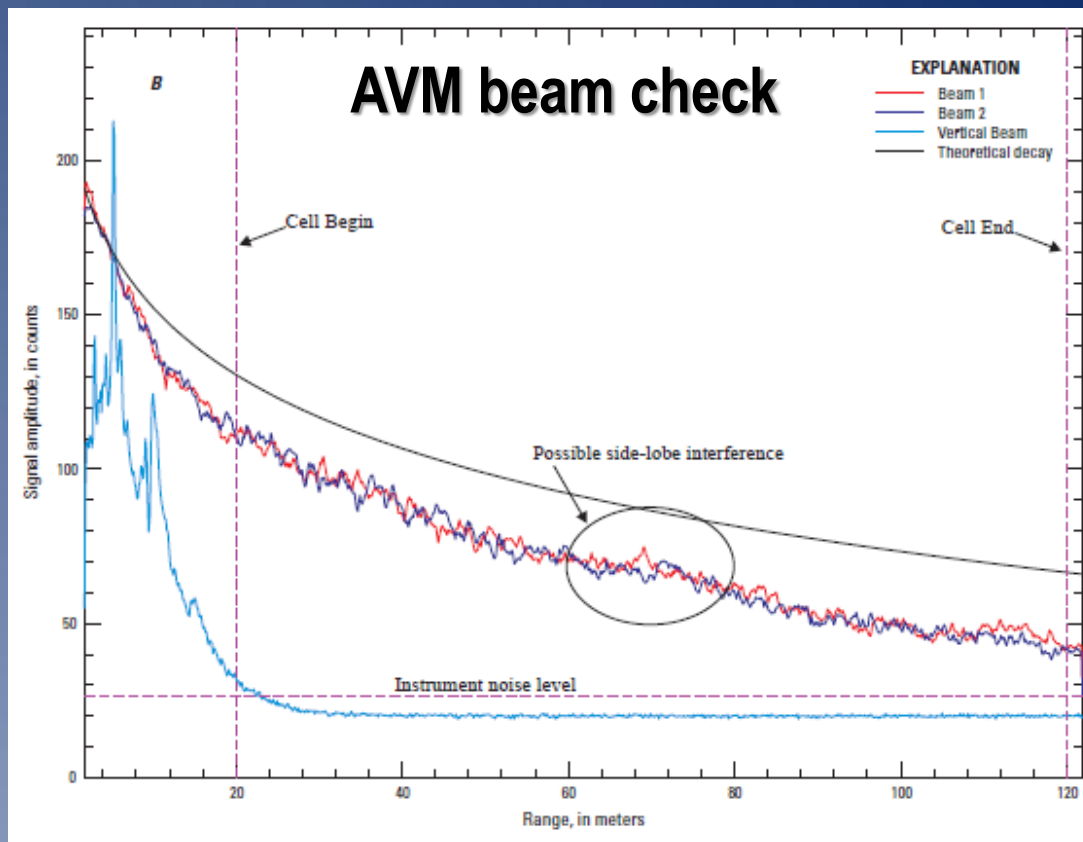
We are currently investigating index-velocity relations for various cell ranges between 0 and 35 feet from the AVM



Computing Discharge Using the Index Velocity Method

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Questions?

